

Original Article

The Economic Impact of Smoking on the Health System in Kuwait

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ABSTRACT

Objective: To estimate some of the cost and the economic impact of smoking on health services in Kuwait

Design: A cross-sectional survey

Setting: Al-Saqer and Al-Yarmok Primary Care Centers, Kuwait

Subjects: Two thousand two hundred and sixteen (2216) male persons were enrolled in this study.

Intervention: Each patient was interviewed by a trained doctor.

Main Outcome measures: The incidence of upper and lower respiratory tract system symptoms with current

smokers compared to non-smokers.

Results: Our study showed a high prevalence of smoking in Kuwait among adult males aged >18 years (40.6 %). It also showed a high incidence of both upper and lower respiratory tract system symptoms with current smokers compared to non-smokers (67.5 and 76.9% respectively compared to 32.5 and 23.1%).

Conclusion: Smoking increases health care costs by increasing the number of clinic visits due to respiratory illness thereby increasing health services utilization and leading to additional societal burden.

KEYWORDS: economic, health care cost, health service utilization, smoking

INTRODUCTION

The smoking epidemic has become a matter of world-wide concern. It is generally agreed that tobacco use, particularly smoking, poses an enormous public health problem and is strongly associated with an increased morbidity and mortality^[1]. It remains the number one cause of preventable diseases in many countries and the foremost reason for the four primary causes of death (heart diseases, cancer, emphysema and stroke)^[2].

It is widely acknowledged that cigarette smoking is strongly associated with increased morbidity and mortality due to a number of diseases, the most recognized of which is lung cancer^[3]. In addition, the various substances contained in cigarette smoke are partly responsible for malignant tumors of the oral cavity and the pharynx. They are a main risk factor for myocardial infarction, cerebral thrombosis, arteriosclerosis and chronic obstructive pulmonary diseases such as bronchitis and emphysema^[4] as compared to persons who have never smoked. The average decrease in life expectancy has been estimated to be 3 - 8 years depending on smoking habits^[5].

On reviewing the literature on smoking, we found that there was a direct link between smoking and various diseases particularly respiratory illnesses. It increases the incidence and the severity of both upper and lower respiratory tract infections, including acute bronchitis, asthma and community-acquired pneumonia and more severe chronic lower respiratory tract diseases. In addition, it is estimated that short-term hospital days are increased by more than 30 percent for diseases linked to smoking. Tobacco is a major contributor to these diseases, which now account for more than half the disease burden on countries. This alarming increase threatens to undermine their economic and social development^[4].

According to World Health Organization (WHO), there are about 1.1 billion smokers worldwide^[6]. The vast majority - 800 million smokers - is in developing countries; 700 million of these smokers are men. The use of tobacco currently account for three million deaths each year worldwide^[7]. The global health care cost resulting from tobacco use exceed \$200 billion a year - more than twice the current health budgets of all developing countries combined^[8]. It is predicted that by the 2020s there will be about 10 million related deaths annually worldwide^[9].

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Cigarette smoking is the nations' leading cause of premature mortality, and is responsible for one-third of all deaths among working - age Americans. Smoking cigarettes is both psychologically and physiologically addictive. Careless smoking also can cause severe burn injuries and death. Many of the adverse effects of smoking occur in second-hand (passive) smokers^[10].

Twenty-three percent of adults aged 18 years or older smoke cigarettes. Over 400,000 adults die from tobacco-related diseases each year^[11]. Smoking affects not only the tobacco user but also those near the smoker, such as family, friends, co-workers and unborn children. Approximately 24 billion packages of cigarettes are purchased annually. In June 2002, the International Agency for Research on Cancer concluded that involuntary smoking (exposure to secondhand or "environmental" tobacco smoke) was carcinogenic to humans^[12]. National expenditures attributable to cigarette smoking surpass \$ 75 billion in medical costs plus \$80 billion in indirect costs^[13].

The Food and Agricultural Organization of the United Nations (FAO) estimated that tobacco consumption in developing nations was increasing at a rate of 1.9 percent during 1995 - 2000^[14]. One of the reasons which explain this rise is lack of awareness of health risks associated with tobacco use, particularly the fact that there is approximately a 25 - 30 year lag time between the onset of persistent tobacco use and the actual deaths attributable to smoking.

Smoking-related diseases represent an enormous economic burden on the health care system. In addition to the traditional burden of communicable diseases, developing countries today are faced with a huge increase in non-communicable diseases, mental illness and violence and injuries. Smoking costs the national health services (NHS) approximately \$ 1.5 billion a year for treating diseases caused by smoking. This includes the cost of hospital admissions, general practitioner consultations and prescriptions. In 1997-98, 364,200 people were admitted to NHS hospitals to be treated for diseases related to smoking. On an average, they occupy 9,500 hospital beds per year every day^[15].

In Kuwait, smoking prevalence among adult males (18 - 60 yrs) was 34.4% in 1998^[16] while smoking prevalence among youth (10 -18yrs) was reported as 23.1%^[17]. Our survey was done to estimate the prevalence of smoking in Kuwait and its economic cost on the health care system.

SUBJECTS AND METHODS

We conducted a cross-sectional survey among persons seeking medical care at Al-Saqer specialized

health center (which served Al-Adeilyyah and Al-Faiha areas) and Al-Yarmok primary health center (which served Al-Yarmok and Qurtoba areas). These were selected as the setting for our study. We decided to enroll all male Kuwaiti and non Kuwaiti persons 18 years coming to these health centers.

The survey collected information on socio-economic characteristics (age, marital status, level of education, employment and nationality), presence of some chronic diseases such as hypertension, diabetes, cardiovascular diseases, chronic pulmonary diseases, bronchial asthma and smoking status.

Respondents were classified as current smoker, former smoker and never smoker. A current smoker was defined as anyone who had smoked more than 100 cigarettes in his lifetime and continued to smoke at least one cigarette daily. A former-smoker was one who had smoked more than 100 cigarettes in his lifetime but no longer smoked. A never-smoker was one who had never smoked or had smoked fewer than 100 cigarettes in his lifetime^[18]. Current smokers were asked about onset of regular smoking, kind of smoking, the number of cigarettes.

All respondents were asked about: reason for health center visit, date of last visit to health center or hospital and the reasons for those visits. We also collected data about number of visits to private clinics as well as pharmacies seeking medical care during last six months.

Data were collected through January - February 2003. The number of cases collected during this period was deemed to be enough for analysis (consensus sample). The questionnaire was pilot tested on a random sample of one hundred persons and some of the questions were modified before it was formally used. For the sample, one hundred questionnaires were distributed and self administered and a team of trained doctors interviewed Kuwaiti and non-Kuwaiti males age > 18 yrs. The response rate was 100%.

In the actual study, two thousand two hundred and sixteen males were interviewed by trained physicians and respondents were told that the information obtained would be confidential and used only for statistical purposes to minimize non-response and under-reporting.

Case definition for the illnesses presented by patients: patients were classified according to diagnosis code of international classification of diseases (ICD-10-CM) after confirming the diagnosis from the attending physician (Table 1).

Data was analyzed using SPSS statistical program and descriptive statistics including frequencies, mean and standard deviation were used to describe the study findings. The association

Table 1: International classification of diseases and related health problems (tenth revision)

Cardiovascular System Diseases (I 00-99)	
I30.9	Acute pericarditis
I20.9	Angina Pectoris
I49.9	Arrhythmia
I70.0	Atherosclerosis
I48.0	Atrial fibrillation
I42.9	Cardiomyopathy
I25.9	Chronic ischemic heart disease (IHD)
I50.0	Congestive heart failure (CHF)
I50.9	Heart Failure
I10.0	Hypertension
I95.9	Hypotension
I50.1	Left ventricular failure (LVF)
I34.0	Mitral valve prolapse
I21.9	Myocardial Infarction (MI)
I73.9	Peripheral Vascular Disease
I26.9	Pulmonary Embolism
I00.0	Rheumatic Fever
I09.9	Rheumatic Heart Disease
I38.0	Valvular Heart Disease
Upper /Lower Respiratory (J 00-99)	
J20.9	Acute bronchitis
J04.0	Acute laryngitis
J35.9	Adenoid Enlargement
J30.4	Allergic Rhinitis
J45.9	Asthma
J47.0	Bronchiectasis
J21.9	Bronchiolitis
J42.0	Chronic Bronchitis
J81.0	Pulmonary oedema
J00.0	Common Cold
J05.0	Croup
J43.9	Emphysema
J05.1	Epiglottitis
J33.9	Nasal Polyp
J01.0	Pneumonia
J93.8	Pneumothorax
J01.9	Sinusitis
J02.9	Sore Throat, Pharyngitis
J03.0	Tonsillitis
J06.9	Upper Respiratory Tract Infections

between two discrete variables was tested by chi-square test. A p value of < 0.05 was considered significant. The 95% confidence intervals (CI) around rates were calculated assuming a binomial distribution.

RESULTS

A total of 2216 male persons, aged 18 years and above were enrolled in the survey. 74.5% of them were Kuwaiti, their mean age was 39 years, 79% were married and 62% were working as officers.

Regarding educational status, 25.4% had secondary school and 24.7% had university level education. 40.6% were current smokers, 13.8% were ex-smokers and 45.6% never smokers. 12% of them had started smoking at the age of 20 years. A majority (79.8%) of the respondents smoked

Table 2: Smoking status and the incidence of chronic disease

Chronic diseases	Smoking status		Total	p value
	Current n (%)	Non n (%)		
Diabetes mellitus	61 (51.3)	58 (48.7)	119	p = 0.7 (NS)
Hypertension	64 (40.3)	91 (57.2)	155	p = 0.003
Cardiovascular disease	9 (40.9)	13 (59.1)	22	p = 0.3 (NS)
Chronic pulmonary disease	11 (91.7)	1 (8.3)	12	p < 0.001
Bronchial asthma	52 (51)	50 (49)	102	p = 0.88 (NS)
Others	147 (47)	166 (53)	313	p = 0.15 (NS)
None	518 (45.2)	627 (54.8)	1145	p < 0.001

Chi square = 14.39, Degree of Freedom = 6, p value = 0.03

Table 3: Smoking status and current symptom

Current Symptom	Smoking status		Total
	Current n (%)	Non n (%)	
General symptom	158 (36.6)	273 (63.3)	431
Upper respiratory	328 (52)	302 (48)	630
Lower respiratory	52 (67.5)	25 (32.5)	77
Gastro-intestinal	82 (49.7)	83 (50.3)	165
Upper & lower respiratory	30 (76.9)	9 (23.1)	39
More than one symptom	250 (43.9)	319 (56)	569

Chi square = 54.64 Degree of freedom = 5 p value < 0.001 :

cigarette and 45.8% smoked one packet (20 cigarettes) per day.

The result of this study was a comparison between current smokers and non-smokers. Ex-smokers were excluded from that comparison.

About 6.5% of respondents had diabetes mellitus, 8.6% had hypertension, 1.5% had cardiovascular disease, 0.6% had chronic pulmonary disease and 5.5% had bronchial asthma while 57.3% had no chronic illness.

The association between smoking status and the occurrence of chronic diseases was almost similar between smokers and non-smokers. An interesting finding was that smoking expresses the overall association with chronic diseases at a p value = 0.03. Fisher's Exact Test was used in case of chronic pulmonary diseases (as the total number was only 12 cases) to compare p value association with smokers and non-smokers. It showed considerable significant association (p = 0.001) as shown in Table 2.

On reviewing the current symptom (i.e. the reason for visiting the health center on the day of the interview) with smoking status, once again there was high percentage of affliction of both parts of respiratory systems; the percentage of lower and combined upper and lower respiratory complaints was 67.5 and 76.9% in current smokers compared to 32.5 and 23.1% in non-smokers respectively as shown in Table 3. The difference was statistically

Table 4: Symptoms during the visit to Health Center with Smoking Status

Symptom of last visit	Smoking status		Total
	Current n (%)	Non n (%)	
General symptom	139 (35.2)	256 (64.8)	395
Upper respiratory	399 (54.7)	330 (45.3)	729
Lower respiratory	73 (64.6)	40 (35.4)	113
Gastro-intestinal	76 (49.4)	78 (50.6)	154
Upper & lower respiratory	16 (80)	4 (20)	20
More than one symptom	203 (40.1)	303 (59.9)	506

Chi square = 72.28, Degree of freedom = 5, p value < 0.001

Table 6: Smoking status and the number of hospital or private clinic visits during last six months

No. of visits	Smoking status		Total	p value
	current	non		
1 - 2	65	45	110	p = 0.01
3 - 4	32	14	46	p < 0.001
5 - 6	10	6	16	p=0.2(NS)
> 7	6	1	7	p = 0.03

significant ($p < 0.001$).

Regarding the symptoms at last visit (not the day of the interview) to health center: 64.6% of current smokers had visited the health center for lower respiratory system symptoms and this was significantly higher than the non-smoker group (34.3%, $p < 0.001$, Table 4). 80% of current smokers had visited the health center for symptoms of both upper and lower respiratory systems in contrast to only 20% non-smokers and this was statistically highly significant ($p = 0.001$).

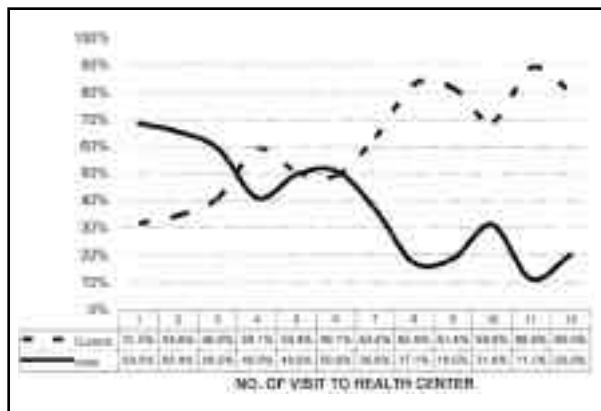
Number of visits to health center during the last six months were grouped into intervals (Table 5), a p value calculated for each group and Normal Z Test used for testing the significance between two proportions which was highly significant ($p < 0.001$). Fig. 1 shows increasing percentage of smokers in relation to increasing number of visits to the health center establishing a clear association between smoking and frequency of visits to clinics.

There was no significant relationship between smokers and non-smokers' symptoms from the last visit to hospital. The number of visits to hospitals or private clinics was higher among current smokers compared to non-smokers. The number of visits was also grouped into intervals as shown in Table 6. Normal Z Test was used to test the p value of each group for comparison between two proportions. The difference was statistically significant ($p < 0.05$).

On the other hand, there was no significant difference between current smokers and non-smokers regarding the number of visits to special

Table 5: Smoking status and the number of visits to health center during last six months

No. of visits	Smoking status		Total	p value
	current	non		
1 - 3	292	521	813	p < 0.001
4 - 6	236	202	428	p = 0.026
7 - 9	156	52	208	p < 0.001
10 - 12	65	21	86	p < 0.001
> 12	25	13	38	p = 0.012

**Fig. 1:** Smoking status and the number of visit to health center during last six months

pharmacy without prescription during the last six months.

DISCUSSION

A direct link is now established between smoking and different diseases, particularly respiratory illnesses. It is well-known that smoking alters lung anatomy and physiology and impairs host immunity, even at relatively early stages of cigarette use, thereby promoting more frequent and more severe lower respiratory tract infections^[19].

This study shows no significant difference between current smokers and non-smokers with respect to chronic diseases except for chronic pulmonary diseases. This is consistent with many other studies in literature that relate smoking with chronic pulmonary diseases as single most important cause^[20]. The current smokers were visiting the health centers more often for respiratory health problems than non-smokers. This reflects as a burden on health care services and is consistent with many studies on the subject of smoking and health care costs that focussed on smoking as the most important cause of chronic pulmonary diseases. This provides an insight into a significant and potentially alterable area of sizable health care expenditure^[1,21]. It is estimated that 80 - 90% of all patients with chronic obstructive pulmonary diseases have history of smoking^[21].

According to the annual report published by the budget department in the Kuwait ministry of

health (2001-2002), the average cost of single visit to GP clinic was equal to 5 KD, while a hospital causality visit costs 18 KD. Hospital out-patient visit costs 40 KD while a hospital admission for one day costs on an average about 80 KD. Our study showed more frequent visits by smokers than non-smokers to GP clinic and hospitals. 88.9% of current smokers had 11 visit per six months to the GP clinic which can be considered a burden on health system services in a small country like Kuwait with the high prevalence of smokers (40.6%). This study identifies that burden of smoking on our society which consists of these medical costs plus productivity losses attributable to smoking-related morbidity, disability and premature mortality.

In the United States, each year approximately 400,000 deaths are attributed to cigarette smoking and costs associated with morbidity attributed to smoking are substantial^[22]. It is estimated that 60% of the direct health care costs in the US go to treat tobacco related illnesses^[23].

As regards the number of visits to the health center during last six months, we found that the higher the number of visits higher is the relationship to current smokers. This is an indication that current smokers are using health services more often than non-smokers. This may be explained by the fact that smoking causes chronic health problems requiring more visits. Treating tobacco dependence produces a strong return on investment by reducing substantially the high cost of treating chronic respiratory diseases, myocardial infarctions and cancers caused by smoking^[24].

There was no big difference between smokers and non-smokers when asked about symptoms during their last visit to the hospital, except for lower respiratory tract symptoms. This was higher in smokers than non-smokers. This is consistent with many studies that emphasize smoking as a causative agent for respiratory tract illnesses^[1,4,21,25].

It was obvious throughout this study that numbers of visits to hospitals or private clinics is higher for current smokers than for non-smokers.

We tried to obtain information on all kinds of health seeking behaviour, either at a government or private facility, to know the frequency of visits so that we could estimate the cost of smoking and its burden either on individual or national level. We found a higher number of visits by current smokers than non-smokers which reflects an additional economic burden.

Comparing current smokers with non-smokers as regards the number of visits to a special pharmacy to seek medications without prescription during last six months, there was insignificant difference between the two groups.

In most countries the resources devoted to health care are increasing and diseases caused by smoking are a major reason for this increase. The emphasis of public health policies tends to be strongly on curative care. Less emphasis is placed on preventive programs which are often viewed as less urgent and less important because they are less specific and are focused on groups within population who may still be healthy. Although these can make a major impact on health education and economic strategies, these strategies are more effective when used in combination^[26].

Countries that adopted comprehensive controls on the use of tobacco indoors, high taxes on tobacco products, smoking cessation programs and health education have had considerable success in reducing costs of health care^[27].

The smoking-attributable costs described in studies are underestimated for two reasons^[28]. First, the cost estimates do not include all direct medical costs attributable to cigarette smoking (e.g., burn care resulting from cigarette-smoking-related fires and costs associated with diseases caused by exposure to environmental tobacco smoke). Second, the indirect costs of morbidity (e.g., due to work loss and bed-disability days) and loss in productivity resulting from the premature deaths of smokers and former smokers was not included in these estimates. This suggests that the total economic burden of cigarette smoking is more than twice as high as the direct medical costs.

CONCLUSION

Our survey showed a high prevalence of smoking among adult males >18 years old (40.6%). Smokers had more visits to health centers for respiratory conditions than non smokers leading to an enormous economic burden on the health care services utilization, thereby increasing health care cost. Smoking cessation programs should be strengthened to decrease number of smokers in the community and thus decrease illnesses related to smoking and the overall societal burden.

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